DOCUMENT RESUME

ED 090 718 EC 061 517

AUTHOR Peck, Eleanor M.
TITLE Rumination, Mental Retardation and Re-Feeding in a Five Year Old. Mental Retardation Training Program Technical Report Series 71-4.
INSTITUTION Ohio State Univ., Columbus. Herschel W. Nisonger Center.
PUB DATE [71]
NOTE 39p.
AVAILABLE FROM Professor Joseph J. Parnicky, Editor. The Ohio State University, Herschel W. Nisonger Center, 9 West Buttles Avenue, Columbus, Ohio 43215

EDRS PRICE MF-$0.75 HC-$1.85 PLUS POSTAGE
DESCRIPTORS *Case Studies (Education); *Eating Habits; *Exceptional Child Education; Exceptional Child Research; Mentally Handicapped; Nutrition; Self Care Skills; Trainable Mentally Handicapped; *Training Techniques
IDENTIFIERS *Rumination

ABSTRACT

Reported is a case study of a 5-year-old, severely retarded, malnourished boy who practiced rumination (regurgitating small amounts of food to rechew and then reswallow). It is explained that the child was premature and weighed only three and a half pounds at birth, that the child was fed only milk prior to involvement with the special preschool program, and that the child's weight and height were below the 10th percentile. Noted is the role of professional management in increasing the boy's weight by five pounds during an 18-day hospitalization, improving his muscular coordination and socialization skills, and successfully instructing him in self feeding techniques. Stressed is the importance of an on-going developmental program to develop other self help skills. Also provided are a discussion of the phenomena of rumination, guidelines for training in self feeding skills, a bibliography of 38 items, and rental information on a color video tape illustrating the project. (DB)

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

ED 090718

college of social & behavioral sciences
college of administrative science
college of education
college of medicine

the ohio state university

CG 09 615 17

The Mental Retardation Training Program, a joint project of the College of Administrative Science, College of Social & Behavioral Sciences, College of Education, and College of Medicine, is committed to the alleviation of the manpower shortage in the field of mental retardation. To this end, it provides an interdisciplinary arena for research and training through the mechanism of service to the retarded.

HISTORY

The impetus for the Training Program began with the Report of the President's Panel on Mental Retardation in 1962, and culminated in the enactment by the 88th. Congress of a series of three pieces of legislation to stimulate research, training and service facilities for mental retardation. In 1965, the report of the Citizen's Committee to the Governor of Ohio specifically stressed the need for manpower training in University-Affiliated Facilities for the Mentally Retarded.

GOALS

The broad objectives of the Training Program are:

- to develop an interdisciplinary approach to mental retardation research;
- to provide interdisciplinary instruction in mental retardation;
- to disseminate information related to mental retardation;
- to develop and promote methods of prevention of mental retardation;
- to expand scientific knowledge in the diagnosis and treatment of the retarded;
- to extend the breadth and depth of both student involvement in the community and in-service instruction for professionals.

ORGANIZATION

To serve its complex objectives, the Training Program has a Policy Council consisting of the Deans of the participating Colleges; a Program Advisory Committee consisting of faculty representatives of many generic disciplines; a Liaison Advisory Committee consisting of representatives of state and community agencies; an administrative triad (listed below); and three Program Coordinators through whom the academic departments relate in order to achieve the stated program objectives.

Address inquiries to:

Mental Retardation Training Program
9 W. Buttles Avenue
Columbus, Ohio 43215

Technical Report Series
of
The Ohio State University
Herschel W. Nisonger Center

The OSU Herschel W. Nisonger Center is an all-University program devoted to instruction, service, and research in problems of mental retardation and other developmental handicaps. Among full time and cooperating staff in the Center are representatives from the following disciplines:

Business Administration
Dentistry
Education
Home Economics
Law
Medicine
Nursing
Nutrition
Occupational Therapy
Physical Therapy
Physical Education
Psychiatry
Psychology
Social Work
Sociology
Speech
Vocational Rehabilitation

The technical report series serves as a mechanism through which the ideas and activities of participating specialists and their students can be disseminated to the larger professional community. Theoretical treatises, operational design concepts, as well as reports of service and research activities are included in the series.

Papers may subsequently be submitted for publication in scholarly journals. For this reason, no quotations from the reports should be made without the written permission of the author(s). Critical reaction to the papers, where appropriate and with permission, will be made available to our readers.

Inquiries regarding additional copies of this report should be addressed to:

Professor Joseph J. Parnicky, Editor
The Ohio State University
Herschel W. Nisonger Center
9 West Buttles Avenue
Columbus, Ohio 43215

THE OHIO STATE UNIVERSITY

HERSCHEL W. NISONGER CENTER

Technical Report Series

71-4

RUMINATION, MENTAL RETARDATION AND RE-FEEDING IN A FIVE YEAR OLD

Eleanor M. Peck, M.S.

Under the Advisement of
Nancy Herrick, M.P.H.

Partially Supported By Funds From

United States Department of Health, Education and Welfare
Maternal and Child Health Service
United States Office of Education

TABLE OF CONTENTS

Introduction 1
Phenomena of Rumination 2
Case Study 7
Discussion 17
Feeding Training 21
Summary 23
Appendix A 24
Appendix B 25
Appendix C 26
Appendix D 27
Bibliography 28

INTRODUCTION

The socialization process demands the acquisition of skills applicable to the mores and norms of the culture. For the mentally retarded child this process is much more difficult in that he must compensate for developmental lags. Life becomes a process of learning the elementary aspects of environmental adjustment.

The growth and development of the mentally retarded child is dependent upon the specific handicap, the age of the child, and the use of professional intervention. In some cases the impairment may be permanent and remain so throughout life; in other instances, it may be in the dynamic state of change which must be managed appropriately.

This report documents the management of a young child with mental retardation, malnutrition and rumination. It is designed to orient the reader to the role of the nutritionist in the improvement of the mentally retarded child's functioning abilities. Even though participation of other professional disciplines are mentioned, a detailed description of their participation and impact on the child is not given.

This study was undertaken in partial fulfillment of the requirement for the Degree Master of Science in Allied Medical Professions, Medical Dietetics. It was conducted at the Nisonger Center at The Ohio State University, Columbus, Ohio.

THE PHENOMENA OF RUMINATION

Rumination is not a natural physiological process for the monogastric human species. Synonymous with rumination is the term merycism. Derived from the Hellenic, it denotes the act of regurgitation of food from the stomach back into the mouth, chewing the food again, and reswallowing it. A second derivative comes from the Latin verb, ruminare, to chew the cud.

The ruminating pattern is predominantly an involuntary act aggravated by emotional disturbances. The adult merycole has been vividly described (6) as one who eats nastily, and inattentively, drinks excess liquids with or soon after meals, is emotionally unstable and completely lacks the gourmet's discrimination. The distinguishable characteristic of this "nauseless vomiting" is the individual's ability to regurgitate a hastily eaten meal one mouthful at a time. The procedure usually begins 15-30 minutes after the meal, lasts from ½-1 hour and occurs 15-20 times within this period. It stops automatically when food begins to taste sour.

Conversely, the ruminating pattern does not always relate to tension in the child. Jessner (14), in studying and observing the rumination pattern in infants indicates complete and purposeful preparatory movements, particularly of the tongue and abdominal muscles. In some cases the hard palate is stimulated by fingers in the mouth. When effort becomes successful and the milk appears in the back of the pharynx, the child's face is pervaded by an ecstatic expression. If the preparatory stimulus of either the tongue or abdominal muscles is interrupted, angry reactions, followed by restlessness full of anxiety, become evident.

Gradually, the infant will begin ruminating with light sucking movements with the lips made before becoming more intense and the mouth opens. The tongue appears in the channeled shape and is pushed rhythmically forward. Gradually the effort is enveloped in tension with eyes "radar-like" and head tilted slightly backward. The merycole infant reaches his climax with a rapid diminuation in tension and a more relaxed body.

History:

In 1618, the Italian anatomist Fabricius ab Aquapendente, (6,14) first described the ruminating syndrome in a Paduan monk and a nobleman. Their condition was said to have been derived from inheritance of bovine characteristics by way of

horn-bearing relatives. Aristotle, Galen, and the Byzantine emperor, Julian the Aposatate, also wrote of merycism. An extensive volume, Merycologia, was published by Peyer (6) more than 300 years ago; Kanner (17) in 1936 published a historical review of the syndrome.

The frequency that merycism is reported has greatly diminished since the nineteenth century. In 1907 Borchbank (5) reported 22 case histories, while Einhorn (9) in 1890 counted 106. The apparent decline in the syndrome may be related to improved environmental-parental practices in child rearing that have developed over the years. Most of the reported cases have involved males of the educational and professional classes. Perhaps the greatest number of merycoles have been physicians. Among the most famous are Edouard-Brown Sequard, and the noted psychiatrist, Paul Näcke.

The syndrome, however, cannot be considered age or class specific. That it may be familially transmitted is evidenced by reports of merycoles in five generations (6). In a number of cases the seriousness reverses itself and becomes quite amusing. Long (18) describes a showman, Hadji Ali, who would eat 30 hazel nuts and one almond for his audience and then bring up the number of hazel nuts requested by his audience before bringing up the almond. Included with this same report is a description of a ruminating physician who doubled the pleasure he derived from good food, particularly marshmallow desserts, by regurgitating and rechewing them.

Pathology - Anatomical

When first examined, the stomach of the merycole appears normal but may be distended or thickened. Because of this feature, it has been referred to as an "hour glass stomach", or "thoraxic stomach". In a number of reports, mention is even made of a "hiatal hernia" (5).

Such an anatomical abnormality has thoroughly confused examining physicians. In evaluating the symptoms, the physicians have made a number of erroneous diagnoses. A number of constitutional factors--pyloric stenosis, pylorospasm, adrenal insufficiency, celiac syndrome, food allergy, esophageal achalasia, duodenal ulcer--are but a few of the misleading diagnoses made before rumination has been elucidated. Griffen (15) reports eleven out of fifty-two cases of infants who have succumbed to the disease because of inanition.

This plus dehydration, electrolyte imbalance and malnutrition have led to death. Holt and McIntosh, as quoted by Griffen (15), predict that as many as 25-50 percent of infant ruminators will die due to failure to reswallow food.

Preventing the high mortality rate, particularly of the infant population, involves the elucidation of factors causing merycism. The pathological study of rumination indicates that it is activated through the automatic nervous system. One instance in which this system may be associated with the syndrome involves continued air swallowings and belching--two characteristics constantly associated with rumination. One study (6) suggests that it is the result of a voluntary contraction of the abdominal muscles. This may be important in the retrograde emptying of the stomach indicating that an increase in the normal pleuropertoneal pressure gradient during inspiration may allow the gastric contents free access into the esophagus.

In a number of studies physiological deformities or multicongenital defects have been cited. One study (6) suggested incompetency at the cardio-esophageal junction, but did not indicate this as a prerequisite to rumination.

The gastric and esophageal activity during the act of rumination has been viewed by Long (18) via fluoroscopy in a 17-year-old male. He indicated that the food was held in the upper part of the stomach producing the effect of an inverted pear. During the act of rumination, a general, squeezing-type contraction occurred. In each instance, the gastric mixture ascended the esophagus so rapidly it was difficult to see.

The evidence thus far does not support a specific anatomical involvement (6) as a cause for rumination because of incomplete and repeatable evaluations. Also negating an anatomical diagnosis is the nonexistent reverse esophageal activity in man (6).

Psychological Involvement:

The classical case of rumination appears to be a psychosomatic disorder in which a profound alteration in the symbiotic relationship with the mother figure is evident. Richmond (26) and others (13,21,30) confirm this concept and relate it to the infant's first period of life, when increased gratification compensates for frustration. They theorize that in rumination this ratio is reversible in that

the infants have experienced frustrations too severe to be tolerated in relation to their age, their level of development and their biological needs.

Thus, it may be concluded that the whole gamet of small acts by which a mother consistently shows her love for her child is altered in the ruminating infant's relationship with his mother. A case is reported (21) in which the mother cared for her child in a passive, mechanical manner with an expressionless face and with no apparent desire to hug or to kiss him. She made no effort to attract his attention, provide stimulation, or elicit a smile. Feeding was also performed mechanically and often too fast. He appeared tense and unrelaxed, crying and spitting repeatedly.

Jessner, (14) in his review of the personality characteristics of four women who had infant ruminators, found that they exhibited immature and inadequate personalities. The women tried to deny their involvement when faced with the prospect of pregnancy; many had trauma during pregnancy accompanied by profound anxiety and fear of death. Richmond (26) and Fullerton (13) indicate that these mothers had, in most instances, inadequate mothering during early life and consequently they failed to fulfill an adult psycho-sexual role.

Dealing with the problem of rumination in infancy as in later preschool and school years has taken many different routes. Therapy programs have involved surgical approaches, pharmacological agents, and mechanical devices. Among the many pharmacological agents used were alkaloids (5,7,9), acids (5,9), and various potions(5). None of these methods have proven successful. Ice chips (9), thorough mastication (5,7), and smooth muscle relaxants (5) have also been suggested but have not proven successful. A therapy program that has yielded prompt response in the patient has been suggested. It essentially places the alienated child in a warm stimulating environment to reverse the deprivation. Richmond (26) describes the reactions of an infant merycole who, when hospitalized in such an environment and given massive doses of tender loving care supplied by a mother substitute, became an alert, responsive child within a few months time.

This procedure of mother substitution has also been heralded by Wright (36) as a possible "cure" for the child ruminator. He reports of a therapy program for school age mentally retarded ruminators 6, 7, 8½, and 10 years of age. The first phase of the program involves a consistent and close relationship with the nursing personnel assigned to the unit. Re-establishing close interpersonal relationships for these children facilitates their capacity to develop trust and meaningful relationships. The second phase is a modification in programming, both in frequency and type of interaction experiences necessary because of on-going behavioral and developmental changes. Thirdly, general support for the developmental needs is given to the child regardless of the child's state of interpersonal progress.

The therapy program initially begins with tactile stimulation, verbalizations, continuity of personnel, and neutral physical surroundings. It becomes increasingly important during the first stage to limit contact to specific individuals because any sharp increase in sensory input frightens these children. During this period rhythmic music appears to have a calming effect on the children particularly during meals. Experimental considerations of environmental manipulation, as well as active behavioral interaction, such as structured play activity and added attention and affection, are most important during the initial phase of the program.

The advancements made by these children in a therapy program of this magnitude included: drastic weight gain; effective availability and spurts in general muscle tone; increased range of motor ability and finger dexterity. Development of self-help skills, extended socialization and communication of physical and emotional needs by verbal and non-verbal methods also ensued.

Some of the techniques used by Wright have been used with a five-year-old merycole diagnosed as mentally retarded. These procedures as well as other involvements with the child are presented in the following case study.

CASE STUDY

Bobby is a 5-year-old Caucasian male who has been diagnosed as a severely retarded child. Coupled with the condition is the syndrome of rumination.

Family history indicates that he is the youngest of five children of the mother's first marriage. Bobby was the product of a twenty-two week gestation. His mother delivered another baby from a normal 40 week pregnancy just 9 months prior to his birth. During Bobby's gestation period, as with four uneventful previous pregnancies, the mother failed to secure prenatal care. Bobby's delivery and physical condition immediately following birth were not significant. His recorded birth weight was 3 lbs. 2½ oz. with a birth length of 16½ inches. The Denver Chart of Infant Mortality places birth weight of this gestational period in a 50% mortality rate (Figure 1).

Because of the high risk factor associated with his birth status, he was placed in an incubator immediately following birth. During the ensuing six week incubation period, jaundice and extreme respiratory distress, strongly suggestive of hyaline membrane disease developed. These signs were not evident when he was discharged at six weeks of age.

Just after the child's third birthday, the mother contacted the Council for Retarded Children, a voluntary agency serving the mentally retarded in Franklin County. She was concerned about Bobby's destructful, restless behavior and requested guidelines to handle his actions. The agency referred her to the Franklin County Program for the Mentally Retarded. A home training consultant from this service was assigned to work with Bobby and approximately one month after the initial contact was made, the mother requested advice concerning institutionalization for the child, because his behavior had ascended to an uncontrollable level. As an alternative to this request, medication was prescribed to calm this hyperactive, restless state, and strict limit-setting activities were initiated. The mother was encouraged and supported in her attempts to follow-through with these plans.

After five home visits, the home training consultant referred Bobby to The Ohio State University Mental Retardation Training Program. The Center serves as a federally authorized and funded facility to provide training for graduate and professional students to learn to work with developmentally disabled children. A complete evaluation was scheduled with the following disciplines represented: Nutrition (Team Leader); Neurology; Pediatric Medicine; and Psychiatry.

Figure 1

Classification of Newborns

University of Colorado Medical Center

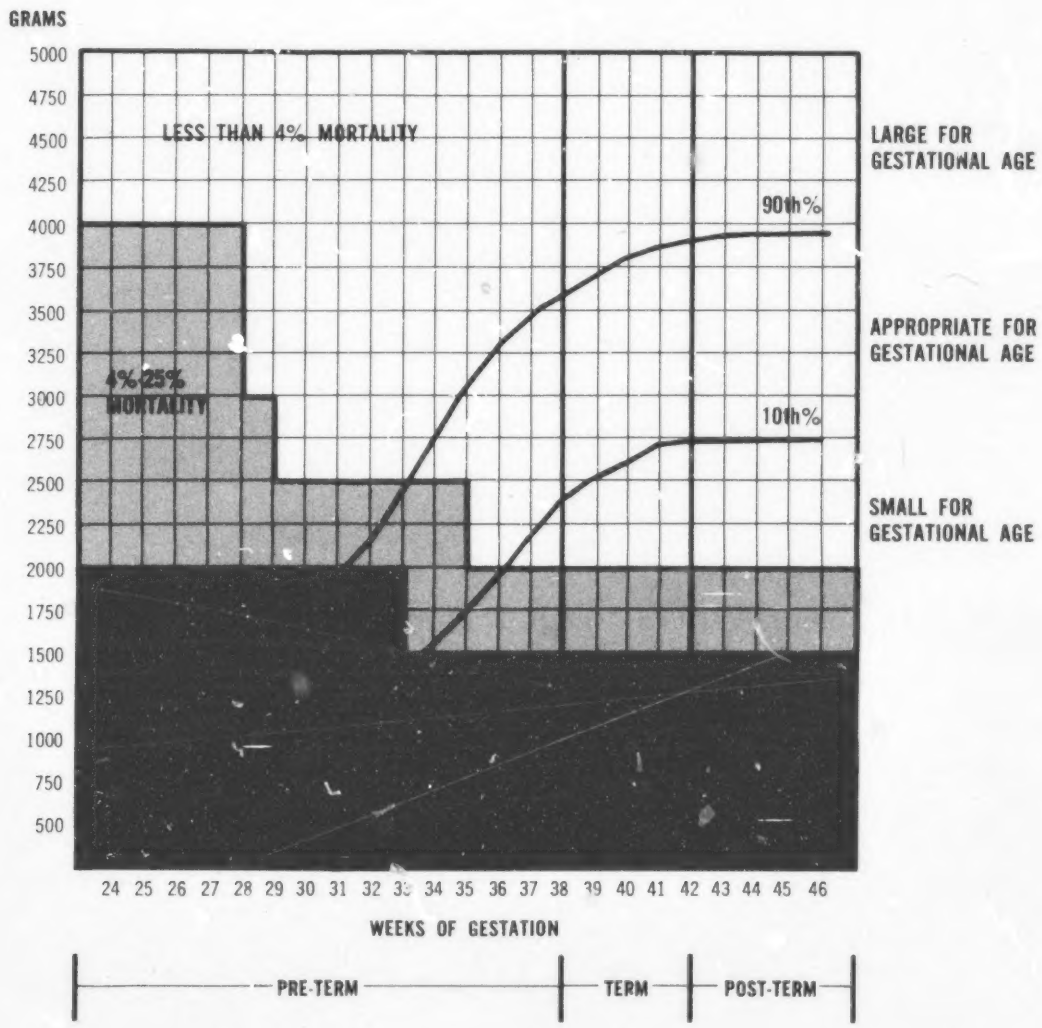
Name

Birth Date

Hospital Number

Estimated Gestational Age

Physician



Classification of Newborns by Birthweight and Gestational Age and by Neonatal Mortality Risk

From: Battaglia, F.C., and Lubchenco, L.O.: J. Pediat. 71:161, 1967. The C. V. Mosby Company, St. Louis, Missouri.
Additional Copies available from Ross Laboratories, Columbus, Ohio 43216.

36984/JANUARY, 1971

LITHO IN U.S.A.

The findings indicated that at 3½ years, Bobby appeared to be a tall, anemic child with poor motor coordination. He weighed 29½ lbs. at the time of the evaluation. This is approximately the 10th percentile on the Harvard Growth Grid for his age. Height of 37-3/4 inches was indicated at the 25th percentile on the same growth grid. He had not received immunization shots.

Developmentally, Bobby was functioning at about the eighteen month level. Behavior was restless and uncontrollable; he was destructful, experienced no sensation of fear, and reportedly controlled his home environment to get his own way most of the time. Gross motor activity was perhaps his best area of development. He had recently learned to negotiate steps, and proceeded up and down them unassisted. Other activities requiring physical coordination were few--he seldom ran but had just learned to jump. Most of his energies were used to rock in a rocking chair.

Bobby seldom played with toys or other objects, rather he would throw objects in any direction. He did enjoy rolling and pushing a big ball and holding a baby bottle for extended periods of time. He was also involved with rapid finger movements.

Sounds and speech syllables such as "ma" and "da" were the only meaningful vocal assertions Bobby used to communicate. He responded to familiar voices, recognized his name and the "no-no" command. He enjoyed music, and was aware of loud sounds such as that of a fire engine or ambulance siren. Generally, he made his needs known by pointing and/or making an unrecognized grunt or "ah" sound.

The child's self-help skills were greatly deficient. He was not toilet trained nor could he dress or undress himself. However, he would help during the dressing procedure by extending his arms so the clothing could be put on him. During a ten month period his nightly sleeping pattern had lengthened from a two hour rest to a complete night's sleep.

Socially, Bobby was aware of a one-to-one relationship, but he was unable to respond appropriately. He had a short attention span, became easily frustrated, and exhibited temper tantrums when he did not get his own way. Usual behavior during these episodes involved crying and throwing himself on the floor. "Rough-housing"

with his older sister was not a favorite activity; he seemed to enjoy entertaining himself without interacting with others.

Assessment of his daily food intake indicated that he had been nourished on as many as twenty, eight-ounce bottles of homogenized milk a day. Validity of this information is questioned, however, this amount of milk supplies approximately 3120 calories, 175 grams protein; 235 grams carbohydrate; and 175 grams of fat. If he did consume this quantity of milk it should have been adequate to provide for the growth needs of a 3 year old child. He could not feed himself nor would he accept solid food. Chewing abilities were absent. Impression from the dietary interview indicated that the family found it easier to give him a bottle rather than attempting any consistency in feeding training. Some of this may have been associated with his birth shortly after another sibling, his hospitalization after birth and mother's having to cope with many problems surrounding his birth.

Because of the multiple opportunities for student participation that presented themselves with this child--physical, emotional, developmental, social, and environmental--Bobby entered the preschool at the Mental Retardation Training Program.

Feeding training was initiated with the lunch meal. His mother was informed of his progress and continuous support was offered to her for home reinforcement of school practices. The bottle was gradually discontinued and in approximately three months, his food intake had progressed from liquids to coarsely mashed food. Solid lumps and coarse textures were refused. He had learned to put a sucker in his mouth and began to hold and drink from a cup without spilling its contents. He was able to eat adequately with a spoon, but needed assistance in filling the bowl of it. He would pick up a cracker, place it in his mouth, but would not bite it. Weight gain during this four month period was 5 lbs.

Bobby's behavior, his increased ability in motor activity and mental comprehension paralleled the increased gains in physical stature. His irritable, insecure feelings blossomed into a warm, expressive personality. Previous irresponsive, restless behavior gradually asserted itself in a more socialized interaction with adults and peers. Increased motor coordination, particularly gross motor skills,

were expanded and he became a self-willed individual capable of testing the limits one had established for him as well as for the other children. Aggressive, destructive tendencies manifested themselves in bodily harm of his peers and himself. These actions became more complex as his health improved. Bobby had increased understanding and comprehension in following directions, and in completing various components of a complet task. Except for fine motor developments, a short attention span and unchanneled behavior, Bobby was a growing, active four year old at the end of this four month period. He had advanced in all areas of development particularly that of self-imaginative awareness of himself and his environmental limitations.

It would be a pleasant ending if Bobby's growth and development continued at this rate. Unfortunately, after four months with no preschool program, he returned in an emaciated state. Previous social, fine, and gross motor skills were now repressed with no self-initiated action. Other developmental advancements were nil during the period.

Expressive language was not evident and he again made grunts, "ahs" or pointing mannerisms to make his needs known. During four individual speech sessions with a graduate student in Speech Therapy, these repressed social, fine, and gross motor skills remained. He appeared to be preoccupied with fear of his external environment and involved with his ruminating activities. He would "whine" and gaze around the therapy room with wide-eyed expressions. Most of the time he appeared to be completely absorbed in his rumination. These two events seemed to be mutually exclusive and almost totally exhaustive of Bobby's time in therapy.

The general goals of speech therapy were: (1) to reduce fear of the therapy session; (2) reduce introspective involvements (finger play and rumination); (3) promote imitation of gross body movements; (4) promote imitation of sounds; and (5) promote meaningful gestural communication.

Of the four sessions, only the second session appeared to be productive in terms of these goals. During the session Bobby imitated /b/, and /p/, and /wh/; he attempted to communicate gesturally his desire for the therapist to open and close the door, to sit down and stand up, and to make noises. His behavior was such that he was not conducive to therapy at that time. The unresponsive and difficult behavior patterns were thought to be related to the child's undernourished condition.

His weight at 29 pounds indicated that in weight for age he was below the third percentile. The decline in weight during this period may be due to food lost during rumination, however, it is more likely that it was associated with the total daily food intake. Bobby refused solid food and had returned to homogenized milk taken from a bottle. This was given to him at mealtime, before afternoon nap and evening bedtime.

Because of the inadequacy of this diet to promote growth, and the past and present potential for improvement, a Medical Dietetic graduate student proposed a feeding training program for Bobby. With the assistance of the Chief of Nutrition at the Mental Retardation Training Center, a three day, one meal per day training session was scheduled one week after he returned to school. The goals of the feeding training session were: (1) to assess his present level of development, and nutritional status; (2) to provide adequate nutriture during the feeding sessions; and (3) to apply appropriate techniques during the training sessions to re-establish and maximize self-feeding skills. The mother was informed of his progress and continuous encouragement and reinforcement of techniques was offered. Eventually, she was proud to report an increase in the child's solid food consumption. This included eggs, liver, chili, spaghetti, oatmeal, pancakes, and jelly. At home sugar was sprinkled on most of the food before the child would accept them.

To complement this success, the student made two home visits to provide further encouragement and support to the family. Observations gained from these visits indicated that Bobby's mother and step-father were proud of their home, the improvements that they have been able to make, and the environment in which they are rearing the children.

The family constellation appeared quite stable. The stepfather maintained a position as a plant electrician and received an adequate salary. Because of many opportunities to work overtime, he rarely had an opportunity to be with the children. He appeared to be intellectually aware of therapy programs for Bobby, but did not display emotional attachment to the child. Even though the mother was more emotionally involved with the child, she frequently indicated that she was not able to cope with his behavior.

She kept a 2 day home dietary record which was evaluated for nutritional adequacy. When the record was compared with the Recommended Daily Dietary Allowance (10) (Figure 2), Bobby's dietary intake was low in calories, thiamine, riboflavin, and ascorbic acid.

FIGURE 2

COMPARISON OF DAILY DIETARY INTAKE WITH
RECOMMENDED DAILY DIETARY ALLOWANCE

	CALORIES	PROTEIN gms	CALCIUM gms	PHOSPHORUS gms	VITAMIN A I.U.	THIAMINE mgs	RIBOFLAVIN mgs	NIACIN mgs	ASCORBIC ACID mgs
WHAT HE HAD	1248	67.0	2.265	1.785	2688	0.576	3.26	1.92	19.2
WHAT HE SHOULD HAVE HAD	1400	30.0	0.800	0.800	2500	0.700	0.80	9.00	40.0

DEFICIENCIES

Blood and urine specimens were taken to supplement this dietary evaluation. Cholesterol, triglyceride, Vitamin A and C, protein albumin, and Alpha$_2$ were within normal range. Iron, total protein and Alpha$_1$ were borderline, and Gamma Protein gave below normal levels. These chemistries did not show physiological undernutrition. However, an examination of the child's weight for height index, and overt physical appearance, showed that dietary intake didnot provide for adequate growth.

During a three week period following this nutritional assessment, Bobby's condition rapidly declined. He showed a two pound weight loss, presented a lethargic attitude during the preschool sessions, and unreceptiveness to any individual or task. Other conditions such as skin irritations on the hips, buttocks, hands, and legs plus the development of an upper respiratory infection alerted other disciplines to the seriousness of the child's health condition.

Professional resources were then mobilized: (1) Supervisor of Preschools and Home Training, Franklin County Program for the Mentally Retarded; (2) Dietician, Clinical Research Unit, Children's Hospital; (3) Pediatric Coordinator, Mental Retardation Training Program; (4) three representatives from the Mental Retardation Training Program Social Work Division; (5) Medical Dietetics Graduate Student and Chief of Nutrition, Mental Retardation Training Program. Their involvement and specific recommendations follow:

The Supervisor of Preschools and Home Training, Franklin County Program for the Mentally Retarded, made the initial contact with Children's Hospital. She became liaison between the hospital and the Mental Retardation Training Program to have the child hospitalized.

The Mental Retardation Training Program's Chief Medical Pediatric Coordinator was instrumental in examining the child and suggesting to the mother that Bobby be hospitalized immediately. He made the referral to Children's Hospital.

The Dietician of the Clinical Research Unit of Children's Hospital, a former Mental Retardation Training Program faculty member who had worked with Bobby during feeding training, investigated channels for the child's hospitalization, specifically his admission to the Clinical Research Unit. Her expertise in menu planning and nutritional calculation provided a quantitative index of nutritive values consumed by the child.

She instructed the parents regarding proper dietary management for the child at home.

The Chief Resident of the Clinical Research Unit accepted the child as a private patient after the Mental Retardation Training Program Pediatrician made the necessary referrals. After an 18 day hospitalization provided thorough medical evaluation, he noted environmental, parental, nutritional, psychological deprivation and recommended out of home placement for Bobby.

The Chief of Social Work and the student coordinator assigned and assisted a Social Work graduate student in providing support to the family and defending the family's commitment to the child. The graduate student assumed primary role as liaison among professionals at the Mental Retardation Training Program, Children's Hospital, and family members. The initial recommendation from the discipline supported a return to the home environment after his physical health improved. After various professional evaluations and recommendations were received, the social work student explored the family's feelings for foster home placement for the child. She was in a position to support the family's decision; presently foster home placements are being investigated.

The 18-day hospitalization period provided consistent follow-through for the medical dietician. During the three regularly scheduled meal periods, as well as the interval in-between the feedings, she was working with the child, establishing a close, trusting relationship, providing support and reinforcing acceptable social actions.

After hospitalization, Bobby returned to the preschool and feeding training. During the two week Christmas holidays when the preschool was not in session, Bobby was transported to the Center for a 7 hour period to insure continued growth. The dietician reinforced activities and skills previously learned and provided a warm stimulating environment for the child during this period.

Summary of Case Study:

Professional management was used to reverse Bobby's undernourished condition. During the 18-day hospitalization his growth was evidenced in a 5 pound weight increase.

Physical activity levels paralleled the increased weight gain. Improved muscular coordination helped him gain independence in asserting himself. Developmentally, he emerged from a non-receptive, listless child to a more aggressive individual aware of himself and his environmental limitations. The central theme of this environmental exploration appeared to revolve around "ego-centric" feelings. His play activity and his socialization with adults and peers, suggested the need to discover the limits that could be attained and the degree to which these resources would take him in expanding his world.

Developmentally, Bobby appeared to be functioning at about the two-year level. He could handle tasks that did not require coordination of fine motor activities. He began to play with different textural surfaces and more consistencies, but could not effectively constitute the pincer grasp with the play items. Socially he became more receptive to adults; he watched other children play, but would not take the initiative to join them. His attention span was quite short; he had difficulty directing his actions and required planned activities to channel his behavior in a constructive manner. Laughing, yelling and sounds of varied pitches and intensity were incorporated into his activities.

Bobby would feed himself without the aid of an attendant reinforcing his behavior. His daily food intake increased to satisfy hunger demands produced by increased growth, physical activity and body maintenance requirements. He developed greater ease in chewing and swallowing coarsely mashed and solid foods.

Maximizing these developmental advancements and initiating new social skills were provided by the Mental Retardation Training Program faculty, preschool teachers and the disciplines participating in an on-going developmental program for Bobby.

DISCUSSION

The influence of nutrition on the health and the total well-being of a child has been documented in the previous case study. This was one example contributing to the wealth of knowledge supporting the need for adequate nutriture during the preschool period. Though improved dietary practices and advances in the science of nutrition have done much to promote this population's growth status, present studies indicate that the preschool population may be deficient in meeting nutritional needs. A review of nutritional surveys (25) indicated that during the period 1945-1965, the diet of the United States infant-preschooler was deficient in ascorbic acid, Vitamin A and iron. These results were also obtained in a more recent study of 107 Ohio preschool children. A higher incidence of anemia coupled with a decreased caloric intake was much more evident in this latter study (24). Other significant sub-clinical investigations show that preschool children had a decreased serum protein level (25) and an ascorbic acid intake lower than that recommended for adequate body metabolism (24).

Studies of the interrelationship of nutrition and the nutritional needs of the mentally retarded have been sparsely reported in the literature. However, the trend appears to be reversing itself for advances have been made in understanding the cause and effect of some of the problems that produce mental retardation.

A major segment of this knowledge concerns the serious effect of undernutrition during the preschool years. It is during this growing period that increments in weight and length may be considered as two of the criteria for adequate nutriture. The problem of sub-normal weight and height increments is most common in the mentally retarded population. Predisposing factors contributing to this include: maternal malnutrition during pregnancy; prematurity; and neonatal malnourishment. Closely correlated with these are the child's multiple congenital abnormalities, his neuromuscular involvements and the emotional patterns of parental acceptance or rejection of the child.

The growth and development of the child must therefore involve a consideration of the physical and emotional potential of both parent and child. Practical dietary management, a priority in any developmental pattern, must necessarily come from the problems presented in this interaction.

The previously discussed case history provides support for an on-going nutritional program designed to improve a

retarded child's growth potential by: (1) applying the principles of nutritional problem solving; (2) employing practical dietary management; and (3) utilizing appropriate feeding training procedures.

Principles of nutritional problem solving included clinical and sub-clinical evaluation of the child. Involved in the clinical assessment were anthropometric data of weight and height, the child's overt physical appearance, and a nutritional interpretation of the home dietary regimen. Blood chemistries and urine analysis provided the sub-clinical assessment of the child's nutritional status.

Several physical characteristics of faulty nutrition presented themselves in the clinical assessment of the child. His weight for age was below the 10th percentile on the Harvard Growth Grid. During a six week period other physical-metabolic involvements became evident. These were: (1) weight loss; (2) inflamed skin irritations on the hips and buttocks; (3) reddened and chapped hands, legs and genital area; (4) emaciated extremities; and (5) a markedly distended abdomen. He became a tense, irritable child totally unreceptive to adults and tactile stimuli. His attitude toward school activity was listless and his rumination pattern increased.

The results of the clinical and dietary evaluation could substantiate a nutritional deficiency. However, research indicates that these two procedures have a large subjective element. Body measurements tell what a child is like, his unusual features, but it fails to provide evidence as to why he is unusual. Dietary recall is not always sufficient to calculate dietary adequacy. The measuring procedure used in the recall did not consider nutrient loss due to food storage, spillage or preparation; not did it account for a possible malabsorption syndrome. Thus, the "clinical" evaluation must be supplemented with laboratory evidence to be used as an index of nutritional adequacy.

Though this principle generally holds for establishing a nutritional index, it appeared to reverse itself in this case. Though Bobby had an overt nutritional deficiency, the blood and urine chemistries indicated that cholesterol, triglyceride, Vitamin A and C, protein albumin and $Alpha_2$ were within acceptable ranges. Iron, total protein, $Alpha_1$ were borderline. Gamma protein was below normal.

Possessing this assessment of the child helped to formulate dietary practices to provide for optimum growth. The essential requirements for growth may be listed as qualitative and quantitative supply of "growth promoters" over and

above the demands of ordinary body maintenance and the cost of physical activity. Essential "growth promoters" may be listed as (1) calories--the food energy supplied primarily from carbohydrates and fat; (2) protein--for cellular multiplication; and (3) vitamins and minerals--the supplemental co-factors of metabolism.

Consideration was also given to a possible malabsorption syndrome, an anatomical abnormality or medication that may have hindered the ingestion or utilization of necessary "growth promoters". An extensive hospital evaluation indicated that these conditions were not contributing to growth retardation.

To replenish the child's energy deficit food energy in amounts sufficient to maintain his body's metabolic activity level and provide for synthesis of body tissue were provided by carbohydrate foods. Generally, these energy-efficient, protein-sparing calories may be made available by increasing the normal caloric requirement between 400-800 calories. These additional calories were obtained by: (1) increasing the quantity of foods; (2) raising the carbohydrate and fat; and (3) providing frequent feedings to include nutritious between meal and before bedtime snacks.

Raising the total carbohydrate level in an undernourished child's diet furnishes additional calories for weight gain. In addition it permit normal metabolism of fat, allows protein to be utilized to build new tissues rather than to provide calories, and encourages normal water balance.

The high caloric density of fat appeared to be a particular asset when energy requirements per unit of body weight were exceptionally great. Essential fatty acids, linoleic, linolenic, and arachidonic, were present in the diet for normal growth, integrity of the skin, and absorption of the fat soluble vitamins. Exceptionally large amounts of dietary fat were avoided because of associated diarrhea and dehydration problems. The efficiency of its metabolic oxidation was also considered when the ratio of carbohydrate and fat was determined.

Protein foods were required for growth and repair of body tissue. Thus, the protein needs of this undernourished child were proportionally greater than those of a healthy child because of more rapid growth. The National Research Council's Recommended Daily Dietary Allowances indicated that increased amounts of protein over and above the maintenance protein allowances should be provided to allow for a weight gain that is 18% protein (10).

Requirements for vitamins and minerals vary considerably with the circumstances of nutritional involvement. As previously indicated, caloric deficiency was reversed with a high calorie, high protein diet. As the caloric intake increased, the requirements for vitamins, particularly thiamine, also increased. The dietary regimen provided adequate levels of all vitamins required under increased metabolic stress.

Other nutrients that complemented the "growth promoters" were calcium, phosphorus, iron, vitamins A, D, E, K, and C. This list is not complete, but may be considered the major nutrients required for optimum growth.

Providing sufficient quantities of "growth promoters" in a high calorie, high protein diet produced a 5 pound increase in weight over ay 18-day period. The caloric intake required to effect this change average 1825 (1289-2183) calories. Of this approximately 904 (608-1104) were carbohydrate, 266 (208-320) were protein, and 668 (486-873) were fat.

Though growth increments complemented the increased caloric intake, the sub-clinical assesment did not reveal any abnormal chemistries except for hemoglobin and iron values. Total iron binding capacity remained within normal range, but a diminishing hemoglobin from 11.2 to 8.7 and iron from 53 to 15 mg% may indicate a hemoconcentrated state prior to recovery. It may also suggest laboratory error because of the single chemical analysis.

The nutritional needs of an undernourished child have been listed as necessary qualitative and quantitative "growth promoters". Complementing their utilization by the body to promote growth, a series of modified feeding training procedures were employed to enhance motor development in the child.

FEEDING TRAINING

Learning how to eat and self-feed is a difficult procedure for the developmentally delayed child. His motor function may be immature, a nutritional deficiency may be evident and/or a severe psychological inadequacy may contribute to the multiple-complexities that fail to promote optimal physical and mental growth.

One or all of these involvements may present emotional conflicts between parent and child. During feeding the child may use his acceptance or rejection of food as a tool to manipulate the parents who are concerned about his nutriture and are helpless in maintaining it if he will not eat a nutritionally adequate meal. Food thus becomes a tool for parents to use as a reward or punishment and the once pleasurable experience develops into a feeding problem in which strong inter-personal relationships are shown.

Correcting these problems and developing a sense of adequacy in weaning the retarded child from bottled liquids to mastering the task of self-feeding more textured products requires time, patience, and routine. A modified child rearing approach that breaks the task down into its component parts is essential. If the type and manner of presenting food to a child are adapted to his individual needs and characteristics, many emotional conflicts can be avoided.

Aspects of feeding training basically concern the child's present functioning level, his potential to learn and parent cooperation in mastering techniques and meeting short-term goals.

An assessment of the child's mental and motor capabilities should be considered before feeding training is initiated. If he has been diagnosed as retarded he may not have the physical control required for eating. Poor posture, extraneous movements of the extremities, inability to suck, to chew or swallow may be coupled with a listless, negative attitude.

Adjusting for these individual growth patterns is the next step in feeding training. Teaching a child self-feeding techniques or the acceptance of new textures in the oral cavity require many long hours of practice. Building on established developments and not forcing the rules from the book of etiquette on the child enhances the learning situation for both parent and child.

It is known that the retarded child is not as sensitive to the environment, but at the same time is more dependent on it. The child explores less and does not learn as much as other children do spontaneously through imitation. Consequently, the environment needs to be more structured to enhance the learning situation.

The operant theory of learning or as some term it--"the reinforcement theory"--provides a useful framework to teach a child certain behaviors. The therapy program basically provides a systematic means of positive reinforcement as a way to communicate expected behaviors. Important components of the procedure include the consistency in presenting the task and the immediacy in positively or negatively reinforcing the produced behavior.

In other instances techniques of shaping and fading are employed to establish behavior. The initial task in shaping begins gradually demanding more complex behaviors as the child's development progresses. Fading begins with the terminal behavior and then gradually fades out the adult's assistance as the child becomes more capable.

These procedures, like all other techniques, must be programmed for each individual, to his level of development, and to his ability to effectively learn the elementary tasks of eating and feeding himself. The success of the program is dependent on the parent, the consistency of therapy and of course, on the ability of the child to gradually develop the self-help skills required for life itself.

SUMMARY

The case presented demonstrates how adequate nutriture and professional support can being about dramatic changes in the mentally retarded child. Reversing the effects created by environmental and nutritional deprivation have been discussed. Through continued training the child under study will eventually acquire the socially productive skills basic to life itself.

APPENDIX A

Eating, to most human beings, is a function which includes more than supplying our bodies with an optimal quantity of fuel to be metabolized; an equally large portion of the pleasure is dependent on the manner in which food is supplied. To provide this necessary pleasure and supplement the child's socialization, the parent should sit with the child during the training session and assist him with the feeding process.

Talking to and with the child before and during the training sessions helps encourage him with each task and provides added socialization.

If spitting of food presents a problem, it is best to sit either to the right or left side, depending on the handedness of the feeder.

The parent should not attempt to feed a child from a standing position for that forces the head back and the neck into extension and makes swallowing more difficult.

If the child is not capable of balance, he should be placed in a semi-reclining position propped on either side to prevent slumping.

Presenting liquids in small quantities in a cup the child can manipulate prevents spills and provides greater ease of handling.

APPENDIX B

Gradually introduce new food consistencies, and new self-feeding tasks to the child. Narrow the expected behavior to one specific task--touching the spoon, tasting the food, etc.--and eventually demand more after each goal has been reached.

Begin with just a taste of the food on the tip of the spoon to acquaint the child with the temperature and flavor of the food. Only after the child has gained acceptance of the food should the spoon be placed on the tongue with some downward pressure. This eliminates the tendency to push the food out of the mouth with the spoon. Placing the entire bowl of the spoon inside the dental arch should be avoided to eliminate the child's tendency to close his teeth on the spoon handle. This precaution necessitates the use of the upper lip to remove the food from the spoon.

Introduce new food texture slowly; liquids to pureed to semi-soft consistencies to solids.

APPENDIX C

Stimulus techniques such as ice or other cold substances applied to the tip of the tongue for a few seconds or gentle pressure at the root of the tongue under the throat may be used in attempting to help the child accept solid food.

Because of sensitive nerve endings near the lip-mouth area, wiping the food from the child's chin defeats the purpose of mouth-lip closure as well as discourages chewing.

Gently pushing the lower jaw may initiate chewing action in the child.

Many retarded children do not like to be touched on the face. To overcome this, encourage him to wipe his face with a terry towel.

Placing a cube of processed cheese or a gumdrop on the lower molar may encourage a child to dislodge the food.

Watching someone chew the same food the child is eating may be an important aid in initiating the chewing motion.

APPENDIX D

Swallowing can be encouraged by stroking the throat gently upward or smoothing the cheek upward, with your finger.

Gently pinching the bulge of the larynx also helps the swallowing process.

Provide food in sizes the child can handle.

Turning the child's chair away from the eating area negatively reinforces undesirable behavior such as playing with the eating utensils.

Provide adequate time to eat a meal in a pleasant relaxed atmosphere. If the child refuses to eat the meal provided during the regularly scheduled session, quietly remove the food and return him to the play area. Eventually, he will learn to consume the food during the scheduled meal period.

REFERENCES CITED

(1) Arnold, Carol B. 1962. Feeding suggestions. Am. J. Occ. Therapy. 16: 290-292.

(2) Baker, Herman, et al. 1967. Vitamins, total cholesterol and triglyceride in 642 New York City school children. Am. J. Clin. Nutr. 20: 850-857.

(3) Barnard, Kathryn. 1968. Teaching the retarded child is a family affair. Am. J. Nursing. 68: 305-311.

(4) Blanchard, Irene. 1963. Better feeding can mean better speaking. Am. J. Nursing. 42: 94-95.

(5) Brockbank, E. M. 1907. Merycism or rumination in man. Bri. Med. J. 1: 421-427.

(6) Brown, W. R. 1968. Rumination in the adult. Gastroenterology. 54: 933-939.

(7) Dambassis, J. N. 1949. The clinical significance of rumination. Am. Practitioner. 3: 309-313.

(8) Dambassis, J. N. 1950. The tendency to ruminate. Am. J. Deg. Dis. 17: 159-161.

(9) Einhorn, M. 1890. Rumination in man. Medical Record. 37: 554-558.

(10) Einhorn, M. 1953. Feeding suggestions for the training of the cerebral palsied. Am. J. Occ. Therapy. 7: 199-204.

(11) Food and Nutrition Board: Recommended Daily Dietary Allowances, Seventh Edition. 1968. Washington: Nat'l. Acad. Sci.

(12) Freud, Anna. 1946. The psychoanalytic study of infantile feeding disturbances. Psychol. Analytic Study of the Child. 2: 119-132.

(13) Fullerton, D. T. 1963. Infantile rumination: a case report. Arch. Gen. Psychiat. 9: 595-600.

(14) Gaddini, R. and E. Gaddini. 1959. Rumination in infancy, p. 166-185. IN L. Jessner and E. Pavenstadt (eds.), Dynamic Psychopathology in Childhood. Grune and Stratton, Inc., New York.

(15) Griffen, N. 1966. Rumination in man. Am. J. Deg. Dis. 1: 963-972.

(16) Grybroski, J. D., W. R. Thayer, and H. M. Spiro. 1963. Esophageal motility in infants and children. Pediat. 31: 382-395.

(17) Kanner, L. 1936. Historical notes on rumination in man. Med. Life. 43: 27-72.

(18) Long, C. F. 1929. Rumination in man. Am. J. Med. Sci. 178: 814-822.

(19) Lucky, R. E., et al. 1968. Adverse conditioning as a means of inhibiting vomiting and rumination. Am. J. Ment. Def. 73: 139-141.

(20) Matheny, M. M. and Doris O. Ruby. 1963. A guide for feeding the cerebral palsied child. Cerebral Palsy Review. 24: 14-16, part 2.

(21) Menking, M., et al. 1969. Rumination--a near fatal psychiatric disease of infancy. N. Eng. J. Med. 280: 802-804.

(22) McNally, E. F., J. E. Kelly, Jr. and F. J. Ingelfinger. 1964. Mechanism of belching: effects of gastric distension with air. Gastroenterology. 46: 254-259.

(23) Nelson, Waldo E. 1964. Normal blood valves, p. 1583-1587. IN Textbook of Pediatrics. W. B. Saunders Co., Philadelphia.

(24) Owen, G. M., C. E. Nelsen and K. M. Kram. 1969. National status of preschool children in two counties in Southern Ohio. Ohio State Med. J. 65: 810-815.

(25) Owen, G. M. and K. M. Kram. 1969. Nutritional status of preschool children in Mississippi. J. Am. Diet. Assoc. 54: 490-494.

(26) Richmond, J. B., E. Eddy and M. Green. 1958. Rumination: a psychosomatic syndrome of infancy. Pediat. 22: 49-55.

(27) Runge, E. C. 1895. Three cases of hereditary rumination. Boston Med. Surg. J. 132: 515-516.

(28) Sinkler, W. 1898. Rumination in man. J. Am. Med. Assoc. 30: 834-837.

(29) Sparks, Donna. 1968. "I won't eat. I won't." Canadian Nurse. 61: 46-48.

(30) Stein, M. L., A. R. Rausen, and A. Blau. 1959. Psychotherapy of infants with rumination. J. Am. Med. Assoc. 111: 2309-2312.

(31) Strawczynski, H., et al. 1964. The behavior of the lower esophageal sphincter in infants and its relationship to gastroesophageal regurgitation. J. Pediat. 64: 12-23.

(32) U. S. Dept. of Health, Education and Welfare. Social Security Administration, Children's Bureau. 1962. Guide for nutrition services for mentally retarded children. N.P.

(33) U. S. Dept. of Health, Education and Welfare. Welfare Administration, Children's Bureau. 1964. Feeding mentally retarded children. N.P.

(34) Waltors, R. H. and L. Dimkow. 1963. Timing of punishment as a determinant of response inhibition. Child Dev. 34: 207-214.

(35) Winship, D. H., et al. 1964. Esophagus in rumination. Am. J. Physiology. 207: 1189-1194.

(36) Wright, M. M. and F. Menolascino. 1966. Nurturant nursing of mentally retarded ruminators. Am. J. Ment. Def. 9: 451-459.

VIDEO TAPE

A color video tape illustrating this project is available.

Rental Information

Tapes for: IVC (color)
660B (black & white)
7500 (black & white)

30 minute or less reel -- $10.00 plus 20% postage & handling

Tapes for: Quad (color)

30 minute or less reel -- $30.00 plus 20% postage & handling

No Material is for sale. If the borrowing institution loses or damages the rental tapes, they will be billed for the replacement of the tape.

For further information, write to

The Ohio State University
Medical Audio Visual and Television Center
Allied Medical Professional Building
1583 Perry Street
Columbus, Ohio 43210
Telephone: (614) 422-3323

PAPERS AVAILABLE IN THE
HERSCHEL W. NISONGER CENTER
TECHNICAL REPORT SERIES

Warner, Valerie A. Gifted Children as Tutors of Educable Mental Retardates. Mental Retardation Training Program Technical Series, Number 68-1, The Ohio State University, July, 1968.

Lucas, Marilyn and Jones, Reginald L. Attitudes of Teachers of Mentally Retarded Children Toward Psychological Reports and Services. Mental Retardation Training Program Technical Report Series, Number 68-2, The Ohio State University, September, 1968.

Jones, Reginald L. Morale of Teachers of Mentally Retarded Children, An Exploratory Investigation. Mental Retardation Training Program Technical Report Series, Number 68-3, The Ohio State University, November, 1968.

Hollinger, Chole S. and Jones, Reginald L. Community Attitudes Toward Slow Learners and Mental Retardates: What's in a Name? Mental Retardation Training Program Technical Report Series, Number 68-4, The Ohio State University, December, 1968.

Silverman, Mitchell. Developmental Trends in the Vocational Interests of Special Education and Normal Students, Mental Retardation Training Program Technical Report Series, Number 69-1, The Ohio State University, January, 1969.

Caldwell, Michael S. Organizing for Interdisciplinary Instructional Field Experiences. Mental Retardation Training Program Technical Report Series, Number 69-2, The Ohio State University, March, 1969.

Clark, Marjorie and Kitchton, Pauline Y. Color Concepts for the Trainable Mentally Retarded. Mental Retardation Training Program Technical Report Series, Number 69-3, The Ohio State University, April, 1969.

Cummins, Connie, Jeffers, Mildred, Morrell, Mary and Zollinger, Virginia. Social Studies Unit on the Family. Mental Retardation Training Program Technical Report Series , Number 69-4, The Ohio State University, April 1969.

Amos, Oris C. and McMahan, Dorothy P. We Go to the Zoo. Mental Retardation Training Program Technical Report Series, Number 69-5, The Ohio State University, May, 1969.

Cavin, Donald C. Innovative Use of Videotape Instruction in Special Education Teacher Training. Mental Retardation Training Program Technical Report Series, Number 69-6, The Ohio State University, June, 1969.

Kunkel, Nancy D. and Gibson, William M. Symposium on Nutrition and Mental Retardation. Mental Retardation Training Program Technical Report Series, Number 69-7, The Ohio State University, March, 1969.

Parnicky, Joseph J. A Study of Halfway House for Educable Young Men. Mental Retardation Training Program Technical Report Series, Number 70-1, The Ohio State University, April, 1970.

Cavin, Donald C. Report on the Survey of Teachers, Administrators, and Home Trainers of the Trainable Retarded in Ohio. Mental Retardation Training Program Technical Report Series, Number 70-2, The Ohio State University, May, 1970.

Parnicky, Joseph J. (Ed.) Stimulating Physical Development of Mentally Retarded Children. Papers presented at an all-day workshop. Mental Retardation Training Program Technical Report Series, Number 70-3, The Ohio State University, June, 1970.

Perozzi, Joseph A. Communication Clinicians for the Mentally Retarded. Herschel W. Nisonger Center Technical Report Series, Number 71-1, The Ohio State University, 1971.

Hardesty, Kay W. Music Activities Guide for the Preschool Trainable Child. Herschel W. Nisonger Center Technical Report Series, Number 71-2, The Ohio State University, 1971.

Perozzi, Joseph A., et al. Annotated Bibliography for Mental Retardation. Herschel W. Nisonger Center Technical Report Series, Number 71-3, The Ohio State University, 1971.